ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Review Article

ROLE OF PANCHAKARMA IN MANAGEMENT OF CANCER PATIENTS

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Article info

Article History:
Received: 18-03-2025
Accepted: 11-04-2025
Published: 10-05-2025

KEYWORDS:
Granthi, Arbuda, Palliative care, Cancer, Ayurveda, *Panchakarma.*

ABSTRACT

Classical Ayurveda texts have several references to cancer. *Charak* and *Sushrut Samhita* described the equivalent of cancer as *'Granthi'* (benign neoplasm) and *'Arbuda'* (malignant neoplasm). *Arbuda* is the most accurate term for a cancerous malignancy. *Gulma* is referred to describe any palpable hard mass over abdomen which could be benign or malignant. In modern terminology, cancer is a group of malignant diseases with characteristics such as abnormal cell proliferation, lack of controlled growth, ability to spread to distant sites and evasion from natural cell death process. Treatment of cancer is based on excision, chemotherapy, radiotherapy and immunosuppressants. These treatments do provide benefits but also decreases the immunity leading to many side effects such as anaemia, loss of hair, recurrent infections, constipation, delirium, mental trauma, etc. Ayurveda explained that aggravated *Vata* and *Pitta dosha* by vitiating the *Rakta, Mansa* and *Meda dhatu* with the *Kapha dosha* gives rise to formation of round, knotty, elevated swelling. Removing these aggravated *Doshas* from the body through *Shodhan karma* is an effective method of treatment. Main aim of this article is to review the role of *Panchakarma* as an effective and supportive treatment as well as managing side effects of chemo-radio therapy. *Basti karma* used as a major therapeutic technique in combating cancer while other Panchakarma therapies plays a major role in management of significant cancers and eradicating all the side effects of chemo-radio therapy. Besides them, Yoga, Pranayama, *Yagna* therapy, meditation also helps in detoxifying the body thus improving quality of life.

INTRODUCTION

Cancer is one of the deadliest problems spreading significantly in 21st century and has now officially become the mankind destroyer in world according to World health organization. The fact of that cancer is related to challenger of modernization and advance pattern of irregular and stress life dominated by western medicine, Ayurveda being the oldest indigenous medicine system is known from very early times for preventing or suppressing various tumours using natural drugs and techniques [1].

The principle of Ayurvedic treatment is removal of *Nidaana* (causative factor) and avoidance of the *Nidaana* (*Nidaan parivarjan*). Ayurveda does not consider cancer as a clear-cut disease, instead Ayurveda states that all disease results from gross systemic imbalances and malfunctioning of *Tri-doshas*. Cancer originates from interaction between abnormal *Doshas*' and weakened *Dhatus*'. For example, vitiation of *Kapha dosha* can lead to both cancer and diabetes however the organs which are affected differs. Thus, weak *Shukra dhatu* (tissue regeneration and cell division) interacting with *Vata* and *Kapha dosha* leads to cancer whereas *Prakupita* (aggravated) and improperly formed *Meda dhatu* (adipose tissue) interacting with vitiated *Kapha dosha* leads to diabetes. The magnitude of illness and clinical presentation of cancer varies from person to person because each one has different patterns of exposure to pathogens and has dynamic changes in the function of *Dhatus*. Instead of using targeted techniques for devastating of tumours, Ayurvedic mode of drug treatment attempts to correct metabolic defects and restore normal tissue functions (*Sama dhatu*). Like most of traditional medicine, Ayurveda is a holistic science, since immunotherapy for rejuvenating the body's support

Access this article online

Quick Response Code

https://doi.org/10.47070/ijapr.v13i4.3585

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system forms a significant component of cancer therapy.

In *Sushruta Samhita*, *Granthi*, *Arbuda* are described as equivalent of cancer. It explained that aggravated *Vata* and *Pitta Dosha*, by vitiating flesh (*Maans dhatu*), blood (*Rakta dhatu*) and fat (*Meda dhatu*) mixed with *Kapha* gives rise to formation of round, knotty, elevated swellings. These Granthi are further divided in 5 types i.e., *Vataj*, *Pittaj*, *Kaphaj*, *Siraj*, *Medoj granthi* according to the *Dosha* dominancy. The *Vataj* type seems as if it were drawn into or elevated, as knotty growth assumes a black colour and is rough and elongated like a bladder. On bursting a *Granthi* of this type exudes clear bright red blood. The *Pittaj granthi* is characterized by heat and an excessive burning sensation of pain like that of being boiled by an alkali or by fire is felt inside. The knotty formation assumes a red yellowish colour and exudes a flow of extremely hot blood on bursting. The *Kaphaj Granthi* is slightly discoloured and cold to touch characterize by a slight pain and excessive itching, feels hard and compact as a stone. It is slow in its growth and exudes a secretion of thick white coloured pus when it bursts. The *Medoj* granthi is large and glossy, it gains or losses in size with gain or loss of fat by patient. It is marked by a little pain or excessive itching sensation and exudes of secretion of fat resembling clarified butter in colour and consistency, made of levigated paste of sesame on bursting. The *Siraj Granthi* can be correlated with aneurysm or the varicose veins in which there is raised knotty formation. [2]

The large vegetation of flesh which appears at any part of body, become slightly painful, rounded, immovable and deep seated and has its roots sunk considerably deep in the affected part, which is due to vitiation of flesh and blood by an aggravated *Dosha* (*Vata*, *Pitta*, *Kapha*) is called as *Arbuda* or tumour. The growth of this body is often found to be slow, the characteristics symptoms of *Arbuda* are same as of *Granthi*.

METHODA AND MATERIALS

Source of review

Ayurvedic literature review was based on *Charak Samhita*, *Sushrut Samhita*, text of allied Medical Sciences on carcinoma, neoplastic growth along with general research papers, articles from different periodical and subjects related information available.

AIM AND OBJECTIVE

1. To review the role of *Panchakarma* as an effective, supportive and palliative treatment in cancer patients.
2. To review the role of Ayurveda in managing side effects of chemo radiotherapy.

DISCUSSION

Ayurveda interventions i.e., *Snehana-swedana* (massage and fomentation), *Vamana* (therapeutic emesis), *Virechana* (therapeutic purgation), *Basti* (per rectal drug administration), *Nasya* (nasal installation of medicine), *Kawal- Gandoosh* (gargling), *Shirosnehana* (head oleation), *Karnpooran* (ear drops) contribute as a main therapeutic technique and alternative compatible palliative care practices for improving quality of life. (Fig. 1.0)

***Panchakarma* Therapies Include**

Snehana* and *Swedana

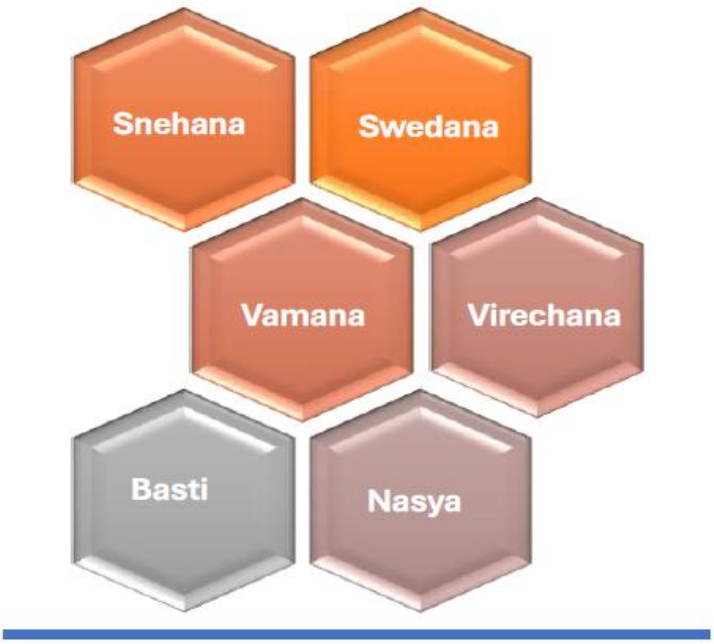

Fig 1.0- Effective Ayurvedic Techniques

Snehana and *Swedana* being the *Purvakarma* of all *Panchkarma* therapies, play a very important role in mobilizing *Dosha* to the *Kostha* to remove easily from the nearest pathway. (Fig. 2.0) In cancer patients, along with physical exercises and yoga, *Snehana* and *Swedana* may be performed. The routine activity is limited of bedridden cancer patients. This brings the staleness and complications like bed sores, thrombus formation, back pain etc. With proper coordination of physical exercises, the use of scientific massage with medicated oil and medicated fomentation, the movements, activity and strength of joints and muscles can be achieved, maintained and developed. This helps not only in improving current quality of life but also in helping future rehabilitation of the patient.

***Snehana* (Oleation therapy)**

Means use of *Sneha* (oil) in the body externally as *Abhyanga* (massage) or internally as *Snehapana* in pure or medicated form. In Ayurveda classic texts, *Abhyanga* should be used as regularly is it promotes anti-aging, alleviates fatigue and *Vata dosha*. Gentle massage with lukewarm sesame oil can be used as multipurpose tool. Oil nourishes the body by absorbing through the skin. It strengthens muscles and joints by enhancing blood circulation, also keep the joint well mobile which is crucial in senile patients and longstanding diseases. The *Abhyanga* can be adopted as daily routine therapy for such patients under medical supervision.

Conditions such as:

- Severe wasting of body
- Hampered ambulation
- Neuropathies/chemotherapy induced peripheral neuropathy (CIPN)
- Any recurrent pain
- Anxiety/ sleeplessness/insomnia
- Patient with altered cognition
- Anxious/stressed patients can be cured by doing up *Abhyanga* on daily basis under medical supervision with *Kshirbala tail*, *Chandan Bala lakshadi tail*, *Ashwagandhadi tail* and *Narayan tailam*, etc. [3]

***Swedana* (Medicated fomentation)**

It is a form of therapy that uses herbal steam to release toxins from the body through the skin perspiration or sweat which is released through the pores of skin. It releases out '*Ama*' and 'toxin' that are deep seated in the body. This therapy is thought to relieve muscular tension, restore flexibility, detoxify the body by eliminating the toxins through sweat and help with muscular inflammation and circulation. *Swedana* is of many types such as *Nadi sweda, Pinda sweda, Upnaha sweda, Washpa sweda* etc. Patient with hampered ambulation, neuropathy, CIPL, any recurrent pain can use-

- *Nadi sweda* with the *Dashmoola* decoction, *Erandmoola* decoction
- *Pinda sweda* with rice, milk, fine powder of herbs like *Ashwagandha*, *Bala*, *Guduchi*.
- *Upnaha sweda* with sand, rock salt, fresh leaves of herbs like *Eranda*, *Nirgundi* etc. [4]

***Virechana* for Aggravated *Dosha* as a fundamental basis for management of cancerous growth and chemoradiotherapy side effects**

According to Acharya *Charak*, *Virechana* is described as a *panchakarma* therapy for expelling all doshas from body. *Virechana* further classifies as *Urdhva virechana* (*Vamana*) which detoxifies body above the umbilicus and *Adho virechana* (*Virechana*) which detoxifies body below the umbilicus.

Vamana chikitsa is used for eliminating aggravated *Kapha dosha* from the body. Nausea and vomiting being the common adverse effect of chemotherapy shall be treated based on *Chardi chikitsa*. If patient is strong enough and especially after the stoppage of chemotherapy therapeutic emesis i.e., *Vamana* should be administered when nausea and vomiting are absent but tends to reoccur.

Vamana is indicated in patients suffering from allergic rhinitis, psoriasis, skin diseases, *Shlipada*, *Galganda*, bleeding from lower body, *Mukhapaka*, *Arsha*, *Atisaar*, *Apasmaar*, *Dushit Stanya*, *Hrillas*, *Aruchi* etc. hence according to *Rogi's bala*, *Roga's bala*, *Dosha awastha* we can administer *Vamana chikitsa* in head and neck cancer, stomatitis, mouth cancer, goitre, lung cancer, benign or malignant tumours present above the epigastric regions.

Virechana being the best treatment for aggravated *Pitta dosha* by eliminating it from the rectal route. The line of treatment is first *Snehana* with pure or medicated ghee, then *Swedana* of any type followed by *Virechana* (therapeutic purgation) using ayurvedic herbal medications such as *Draksha*, *Ikshuras*, *Vidari kand*, *Trivrita* etc. and then finally administration of *Shamana aushadhis* which are having sweet, astringent, bitter taste and are cold in potency for example *Khajoor*, *Yashtimadhu*, *Chandan*, *Vasa*, *Ushir* preparation containing rose and honey milk and ghee etc. Thus, removal of vitiated *Pitta dosha* from the body leads to pacification of side effects of chemotherapy such hair loss, stomatitis, pharyngitis, ulcers, loss of appetite, constipation etc. [5]

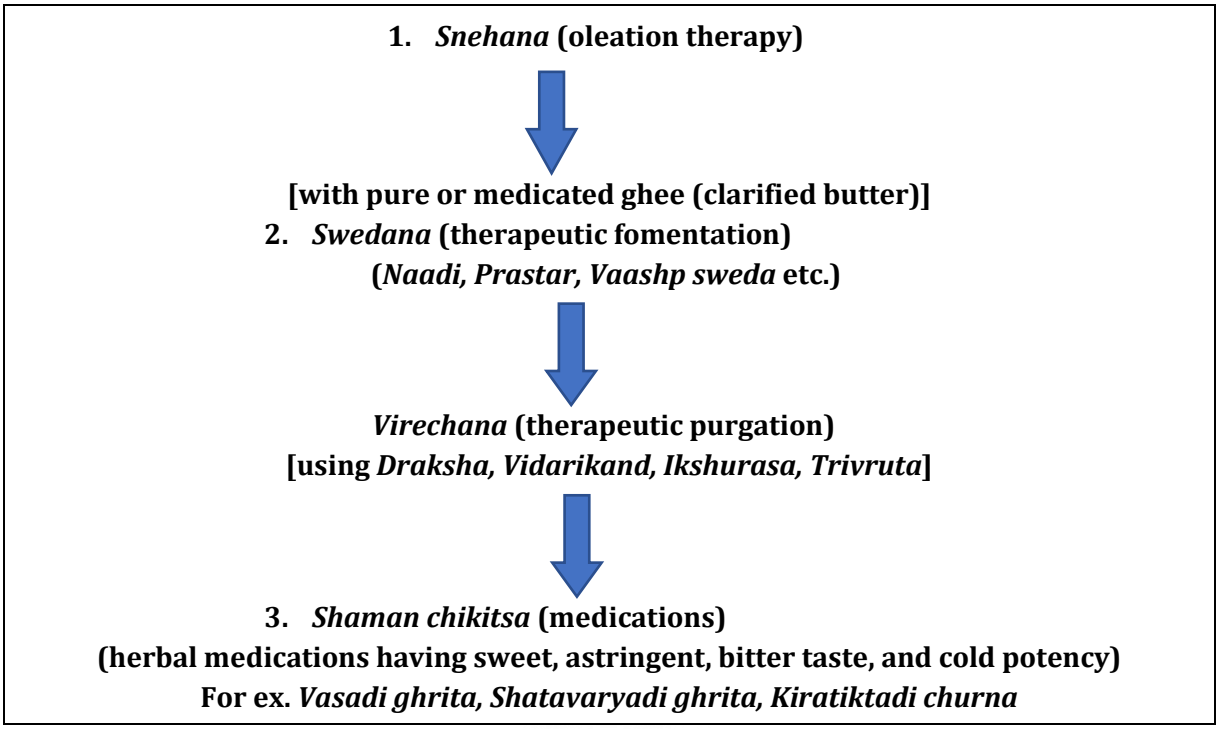
1. *Snehana* (oleation therapy)
[with pure or medicated ghee (clarified butter)]
2. *Swedana* (therapeutic fomentation)
(*Naadi, Prastar, Vaashp sweda* etc.)
Virechana (therapeutic purgation)
[using *Draksha, Vidarikand, Ikshurasa, Trivruta*]
3. *Shaman chikitsa* (medications)
(herbal medications having sweet, astringent, bitter taste, and cold potency)
For ex. *Vasadi ghrita, Shatavaryadi ghrita, Kiratiktadi churna*

Fig. 2: Flow chart Representing Ayurvedic Treatment [5]

***Basti* as a main effective Therapeutic option**

Ayurveda describes two principles of treatment: *Shaman chikitsa* (palliative treatment) and *Shodhana chikitsa* (therapeutic body purification). *Shamana chikitsa* is indicated in diseases with *Alpa dosha awastha* while *Shodhan chikitsa* is considered in condition where toxins and vitiated *Doshas* are deep seated in the body [6]. Different type of formulations like *Churana*, *Kwath*, *Vati* are used in *Shaman*, while in *Shodhan* different procedure are carried out.

Understanding pathophysiology of cancer

Cancer is defined as multiplication of cell far away from the normal tendency with hampered apoptosis process. Therefore, formation of a tissue mass due to abnormal, excessive, uncoordinated, autonomous and purposeless proliferation of cell even after cessation of stimulation for growth occurs. In normal cell cycle, the cell death occurs in a particular time period but in Cancer condition the cell does not shed off, but its division starts in tremendous speed. Due to this high rate of cell proliferation the tumour cells do not receive adequate nutrition and undergo ischemic nutrition[7]. At a stage when malignant cell grows in their number the inner side of tumour cells get devoid of nourishment which causes necrosis of cell. This process causes damage to be surrounding cells and tissues which leads to different adaptive changes in them such as hyperplastic, dysplastic variations. (Fig. 3.0)

According to Ayurveda, all these changes occur due to vitiation of *Vata dosha* and deviation in its *Gati* (movements) which gives rise to proliferation of the tissue in disturbed as well as desynchronized way.

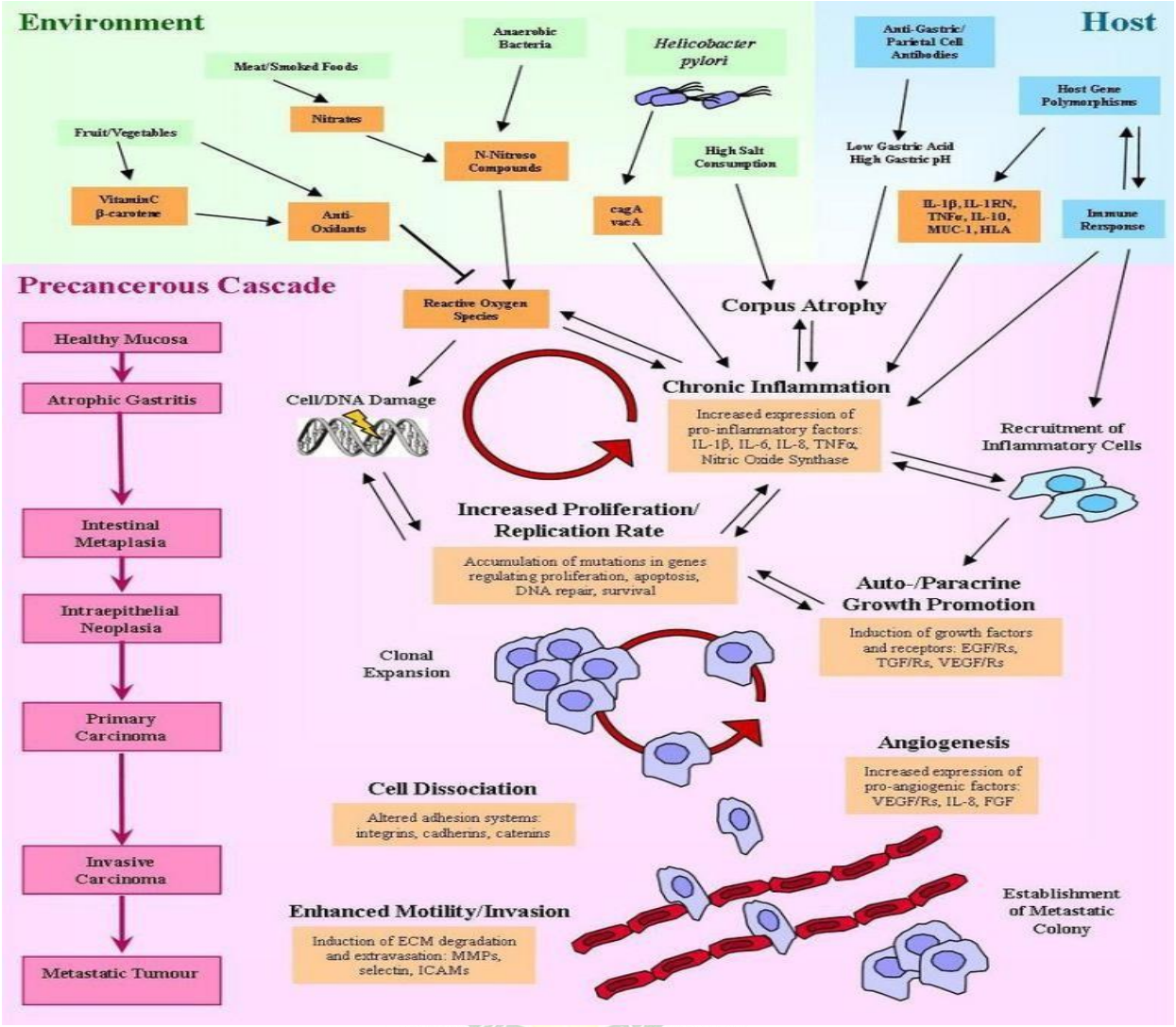

Fig. 3.0: Pathophysiology of Cancer [9]

It has been termed in the Ayurveda classics that *Srotodushti* of body tissues occurs in four different pattern which are narrated as- '*Atiprvritti*' (excessive production of tissues), '*Sang*' (obstruction of molecular movement in *Srotas*), '*Sira granthi*' (formation of cysts and tumours in *Srotas*) and '*Vimarg Gaman*' (movement of molecules in inappropriate directions in body) [7]. This kind of vitiation of body *Dosha* especially *Vata* exploits the body tissues and according to the nature of tissues/*Dhatus* the reactionary responses are noted in them. A specific etiological factor has affinity to vitiate the specific *Dosha* and causes the exploitation in particular body tissues.

From the above explanation, it is very clear that '*Atiprvitti*' resembles with the 'hyperplasia and hyperplastic changes in the body which is one of the cardinal features of almost all neoplasms. Most of neoplasms day by day grow in their size and cause obstruction i.e., '*Sanga*' in the body channels, for example, cancer of sigmoid colon 'obstructs' the faecal matter movement and give rise to the constipation as very initial symptom the disease. Different 'haemangioma' is nothing but the hyperplastic tumours of body vessels i.e., '*Sira Granthi*', while 'extensively spread metastasis and dysplasia' is a typical example of '*Virmarggamana*'. Hence, cancer is a fatal disease, with poor prognosis affecting the quality of life and productivity of individual as all types of *Dushti* has been occurring in almost all the body tissues. The comparative study of *Basti karmukatvma* in cancer has been shown in table no. 1.[9]

Among all treatment protocols of therapy, *Basti* is said to be very effective treatment carried out for the disease caused by vitiated *Vata dosha*. *Basti* itself is considered as half treatment or *Ardha Chikitsa* as it is the only *Panchakarma* or a *Shodhana* technique which helps to nourish the body tissue along with its rejuvenating effect. Cancer is one of the diseases having utmost requirement of rejuvenation and *Shodhan* effects simultaneously; therefore, *Basti upkrama* is the best treatment planned for cancer patients.[10]

Administration of medicinal formulations from anal route is called as *Basti* in Ayurvedic science. It is of 2

types i.e., *Anuvaasan basti*, *Asthapana*/*Niruha basti*. Another type of *Basti* is also explained which is given per vaginal or per urethral route for genito-urinary anomalies. In cancer, a balanced combination of *Shodhan*, *Brihman* and *Rasayan karma* is indicated and therefore, *Yapana basti* is said to be more effective in cancerous conditions [11]. It is a type of *Niruha basti* which works in dual manner. On one hand it helps in purification with ease and soothing effect while on other hand in work as nutritive to nourish the body tissue and might help to protect the healthy tissue from dysplastic changes.

Research shows that *Basti chikitsa* modulate immune responses by regulating through cytokine immunoglobulins and function of T-cells. There are certain research papers and articles on pharmacodynamics of *Basti dravya*. *Basti* is indicated in all kinds of intestinal obstructions, colo-rectal cancer, osteosarcoma, osteoporosis, bone cancer because *Asthi dhatu* and *Vata dosha* have an "*Aashraya-aashrayi bhaav* relation". The active principle of *Basti* drugs is absorbed by active transport and diffusion because they are mainly water soluble whereas *Sneha basti* and other nourishing *Basti* contain hypoosmotic solution facilitating absorption into the blood. Effectiveness of *Basti*. (Table 1)

Uttar basti as Panacea in all Genito-urinary ailments

It is an important *Panchakarma* procedure for the genito-urinary disorders of both male and females. The therapy involves administration of a medicated oil, *Ghrita* or decoction into urinary bladder or uterus. In this procedure medicine is inculcated in the uterus in females per vagina or in bladder in males and females per urethra. It is proven that *Uttar Basti* per urethra is effective in benign prostate enlargement, urinary incontinence, urethral stricture, recurrent urinary tract infection, cystitis, male infertility etc. When administered per vagina in females it is useful in infertility, spontaneous abortions, fibroids, tubal blockage, DUB, various cervical cancer, uterine cancer etc.

Uttar basti is used to treat chronic inflammation of genital tract and may help arrest the progression of cancer. The role of *Uttar basti* in case of benign enlargement of prostate was observed in 18 patients, the patient reported passing of urine without pain and after a week burning and strain during urination was released, within 2 weeks the patients were symptom free. [12]

Table 1: Effectiveness of *Basti* in Cancer [9]

S.no.	Cancer symptoms	Ayurveda interpretation	***Basti karmukatva*** (Pharmacodynamics to control the cancer pathogenesis)
1.	Apoptosis of cells Programmed cell death	*Dhatu Paka*	*Rasayana chikitsa* (rejuvenating effects)
2.	Tumours and neoplasms	*Arbuda*	*Lekhana- dosha nirhana -shophahara* (removes morbid humors and toxins)
3.	Obstruction	*Vatavriddhi - Sanga*	*Srotas shuddhikara* (cleansing of channels)
4.	Hyperplasia	*Atipravitti*	*Vaayu swamaarga gati* (controlled movements of tissue metabolites)
5.	Dysplasia	*Vimarggamana*	*Dosha dhatu Samya gati* (channelizes the proper nutrition to all body tissues)
6.	Metastasis	*Bahuroga marggati*	*Dosha dhatu samaya gati*
7.	Reduced immunity and multiple system involvement	*Dhatu kshaya evum ojas kshaya*	*Brihmana -dhatu vriddhikara-* (well nourishes body tissues)
8.	Hampered metabolism	*Agnimandya*	*Agni deepan* and *Pachan-* (improves digestion and cellular metabolism)
9.	Vital organ metastasis	*Marma abhighata*	*Marma paripalana* (maintain balance of vital organ, physiology to restore body functions)
10.	Poor prognosis of CA	*Praan-agni-ojus kshaya*	*Praan-agni-ojus Raksha* (vital stability)

Shirovirechana (Nasya) as an effective care in Head and Neck cancer

This is the technique of instilling various forms of medications such as liquid, powder, oil formulations in nostrils. *Nasya Karma* is one of the well-known panchakarma procedures. "Head and neck cancer" is 6th most common cancer worldwide and most of them are squamous cell proliferations.

Nasya improves regional circulation and its passive absorption through the cell membrane helps in sustaining the specific gravity or viscosity of mucous. *Pratimarsha nasya* is of low dose and advised for its sustainability as well as to improve health status. In this medicated oil is used in very low dose, advisable in every age group and does not require any preparations but certain precautions are mandatory. It is contraindicated in person suffering from running nose, indigestion, fever and after alcohol consumption. In Ayurveda classical texts, nose is called as gateway of brain thus, certain medicinal formulations are used which have very good impact on brain hence improves nerve regulation. Prolonged use of *Pratimarsha nasya* is revitalizing i.e., avoid cell damage, improves quality, life span of cells and contribute for regular production of new healthy cells.[13]

Multidimensional capability of *Nasya* reinforces co-ordination between body and mind to work in accordance, endorses optimal function of individual organ/system with in and in relation with other organs/system to perform their function efficiently for integrity, in total to optimise immunity.

Benefits of *Shirodhara* in managing stress related complications in cancer patients

Stress and cancer

There has been a strong impact of psychosocial factors on development and progression of cancer. A clinical study was done on stress, in which *Shirodhara* used as a treatment of choice in management of anxiety and improving sleep pattern. Stress and insomnia are common but one of the major side effects of chemoradiotherapy which decreases one's immunity level and self-healing power. The study reveals that this therapy restores the equilibrium of *Sharir* and *Manasik* dosha which in turn facilitates the *Prassan-atma-indriya-mana* (tranquility of mind) and reflects positive sign of healthy body. *Shirodhara* is one of the *Panchakarma* technique that involves pouring liquid *Dhara* of oil, milk, butter milk or water onto your forehead. It helps in regulating circadian rhythm, decreasing

Vata Pitta dosha, regulate memory and functions, decreasing psychosomatic disorders, decreasing systolic and diastolic blood pressures and improving blood circulation.[14]

Ayurveda based management of common chemo radiotherapy side effects in cancer patient

The cell division and differentiation are under the control of balanced *Vata*, when *Vata dosha* is aggressively aggravated the division of these cells and differentiation takes place in an uncontrolled way. Therefore, *Vata* shall be considered as major culprit behind the pathogenesis of cancer. The treatment modality of radiotherapy is a type of *Tejas mahaboot* chikitsa which can be considered as modified radiation of *Agnikarma* according to Ayurveda. The *Ushna*, Tikshna, *Ruksha guna* of *Agni mahabhoot* performs the function listed against radiotherapy. These properties cause the vitiation of *Vata, Pitta* and *Rakta*, which may be local and generalised. Because of the increase in *Ruksha*, *Ushna*, *Tikshna* property, the *Kapha* decreases leading to *Oja kshaya*. This leads to *Dhatupaka* (vitiation of tissue elements) and *Bala kshaya*. (Fig. 4.0) Thus, the patient taking this treatment loses his own *Bala* to protect himself again the adverse effect of radiotherapy. While chemotherapeutic agents can be considered as *Visha Dravya* (toxins) as per Ayurveda. These hot potency agents and *Tikshna dravyas* work as a two-edged sword which while destroying cancerous cell also destroy healthy normal growing cells of the gastrointestinal tract, mucous membrane, skin, hair root and so on. Hence the medical therapeutics of chemotherapy can be described on the concept of *Visha*. The chemotherapeutic agents seem to possess properties like *Ruksha, Ushna, Tikshna, Sukshma, Ashukari, Vyavaayi, Vikasi, Vishada, Laghu.* And most of these properties are opposite to the *Rasa, Kapha* and *Ojas* and like the *Rakta, Pitta*, *Vata*; hence chemotherapy agents may also cause *Vata-Pitta Vriddhi* and *Kapha kshaya*, leading to *Oja kshaya*.

Important *Vata* controlling Measures

Rasayan chikitsa, Santarpan chikitsa, Brihman chikitsa, Balya chikitsa, Vajikarna chikitsa.[15]

In a randomized control study oral administration of another herbal ayurvedic preparation called *Rasayan avaleha,* has shown significantly better effect in controlling the adverse effect of chemotherapy and radiotherapy than the control group. Similarly in an animal study it was observed that *Chawanprash avaleha* has a potential radioprotective effect in animals which are exposed to gamma radiation. A review describes a herbal Ayurvedic preparations called *Triphala* which contains three ingredients *Haritaki, Vibhitaki, Amalaki* are useful in cancer as an anti-cancer chemoprotective and radioprotective agent. Another Ayurvedic herb *Guduchi* has shown its potent radioprotective effect in animal experiments in the experimental group. Who consumed *Guduchi* leading to significant increase in

body as well as the tissue weight in comparison with the control group. (Table no. 2)

Table 2: Managing common side effects of chemotherapy through Ayurveda

S.no.	Side effects of chemo therapy	Ayurvedic Classical texts	Research based Ayuveda
1)	Mucositis	*Khadiradi vati* for chewing mouth gargle with *Kala churna* (c.s.26/195-199)	Oral application of *Yasthimadhu* powder with honey. *Triphala* administration 5 days prior to chemotherapy.
2)	Nausea and vomiting	Powder of *Haritaki* with honey. *Khandkushmaandavleha* *Eladi churna*	Herbal extract of *Yashtimadhu* (Kadur Ramamurthy Ravindra et al) 2012 Ginger supplementation
3)	Anaemia	Oleation, purgation, oral intake of cow's urine with milk or decoction of *Triphala* for 7 days (ch.s.16/64)	*Dhatriavleha*
4)	Diarrhoea	*Pippali* powder with honey then buttermilk with powder of *Chitrak* or *Pipplayadi yoga*. (c.s.29/79) *Dadimasthak churna* (ch.s.29/113)	Herbal extract of *Brahmi* and *Jatiphala*
5)	Constipation	*Triphala* with warm water and ghee (c.s.26/27-28) Castor oil with milk	Isab husk, senna extract, *Triphala*. TLPL/AY/01/2008.
6)	Pharynigitis	*Khadiradi vati* for chewing	Spray of 5 aromatic plant oils
7)	Sleep problems	Whole body massage, bath, rice with curd/ghee/milk, music, comfortable bed (c.s.21/52-54)	Methoinic extraxt of *Mundi* has sedative effect. Dietary supplements of *Shweta Musli* and *Aatmagupta.*
8)	Hepatotoxicity	*Panchkola ghrita*, *Rohitaka ghrita* (c.s.ch.13/83-85, 13/149, 13/79)	*Punanrnavaasthak kwath*, syp. Liv 52, syp. *Kumaryasav.*
9)	Male infertility	*Gokshuradi modak* (*Bhaavprakash* 25/27)	Mucuna puriens
10)	Female infertility	*Brihat shatavari ghrita*	*Ashokaristha*
11)	Fatigue	*Ashwagandha*, *Shatavri* (c.s.sutra 4/7)	*Ashwagandha ghrita*
12)	Skin changes	Massage with *Bala tail* (c.s.chi. 28/30)	
13)	Cognitive deficit	*Kalyanak ghrita* (c.s.chi.9) *Chawanprash* (c.s.chi.1/73)	*Chawanprash*, *Ashwagandha*
14)	Hair loss	*Nasya*, *Murdhni taila*	*Rasayan sevan*, *Amla*, *Bhringraj*, *Methika*, *Brahmi*
15)	Brittle nails	*Basti* with *Tikta ghrita*	*Panchtikta ghrit guggulu, Gandhak rasayan*
16)	Loss of libido	*Rasayana* and *Vajikarna (c.s.chi.1.2)*	
17)	Loss of apetite	*Deepan, Pachan*	*Trikatu, Guduchi, Shunthi*
18)	Weight loss	*Brihmna, Balya chikitsa*	*Ashwagandha*, *Vidarikand*, *Mucuna prurita*
19)	Bleeding problems	*Raktpittahar chikitsa*	*Vasa*, *Laksha*, *Yashtimadhu*
	Hearing impairment	*Murdhni taila abhyanga*, *Nasya*, *Karnapurna*, *Basti*	*Triphala Guggulu*, *Saraswataarishta*, *Balarishta*

	Stress and depression	*Shiroabhyanga*, music therapy, *Shirodhara*, *Yagya* therapy	
	Peripheral neuropathy	*Swedana*, *Snehana*	*Atibalamula*, *Bala tail abhyanga*
	Urinary/bladder problems	*Mutrakricha*, *Mutraghat chikitsa*	*Gokshur*, *Varunadi kshaya*
	Recurrent infections	*Rasayana sevan*	*Amla*, *Chawanpraash*, *Rasayan avleha*
	Pain	*Abhyanga*, *Swedana*, *Balya chikitsa*	

Ayurveda for inhibiting growth of cancer stem cells

Many studies report the interconnection between inflammation and cancer. The identification of transcription factors such as NF-KB, AP-1 and STAT 3 and their gene products such as tumour necrosis factor, interleukin-1, interleukin-6, chemokines, cyclooxygenase-2, 5- lipoxygenase, vascular endothelial growth factor have provided the molecular basis for the role of inflammation in cancer. These inflammatory pathways may get activated by tobacco, stress, dietary agents, obesity, alcohol, infectious agents, irradiation and environmental stimuli. These pathways have been implicated in transformation cancer cell survival proliferation invasion chemo-resistance and the radio-resistance in cancer. The survival and proliferation of most types of cancer cells themselves appears to be dependent on the activation of these inflammatory pathways through their precursor, presumably cancer stem cells.

Ayurveda works on fundamental principles of *Tridosha* and *Panchmahabhuta*. According to Ayurveda the inflammatory process in manifestation of abnormally increased *Pitta dosha*. Most of above-mentioned herbs in the management of chemo-radiotherapy side effects are *Pitta dosha* mitigating and thus, these herbs may indirectly inhibit the growth of cancer stem cells via reducing inflammation.

Rasayana chikitsa

It is one among the eight limbs of Ayurvedic treatment which acts through various ways. The emerging data suggest that the possible mechanism may be by immune stimulation, quenching free radicals, enhancing cellular detoxification mechanisms, repair damaged non-proliferating cells, include cell proliferation and self-renewal of damaged proliferating tissues, and replenishing them by eliminating damage or mutated cell with fresh cells. Thus, *Rasayana* may also inhibit cancer stem cells.

According to a research paper, *Rasayana* therapy showed clinically meaningful antitumor activity and provided significant symptom relief in the lung cancer patient who failed to get satisfactorily response to first line chemo radio therapy. It can be considered as an effective therapeutic option in patients who fails to respond to conventional anticancer therapies.

CONCLUSION

This manuscript includes a very important area regarding role of *Panchakarma* as an effective, supportive and palliative treatment for cancer patient and various techniques for reducing the side effect of chemo radio therapy. *Basti karma* used a major therapeutic technique in combating cancer while other *Panchakarma* therapies such as *Vamana*, *Virechana*, *Shirovirechana* (*Nasya*), *Shirodhara* and *Rasayana* therapy also plays a major role in eradicating all major and minor side effects of chemo-radiotherapy. In this review paper, we conclude all the *Yuktivyapashraya* chikitsa principles. Besides these, *Yoga* and *Pranayama*, chanting mantra, meditation, *Yagya chikitsa* etc. also helps to grow new healthy cells in our body and detoxifies our mind which in turn boosts our mental capability and capacity.

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Cite this article as:
Kanishka Singla, Rajeev Kumar Singh. Role of Panchakarma in Management of Cancer Patients. International Journal of Ayurveda and Pharma Research. 2025;13(4):98-107.
https://doi.org/10.47070/ijapr.v13i4.3585
Source of support: Nil, Conflict of interest: None Declared

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